

Ariadnes Colles

Chaos unit (set of disorganized hummocks set in a flat topographic low)

Different type of chaos than chaotic units east of Valles Marineris

One of the deepest portions of Eridania basin: a larger, possibly paleo-lacustrine system (Irwin *et al.*, 2004)

Chaos hummocks consist of light-toned indurated material

CRISM spectra consistent with the presence of Fe/Mg smectites, and other hydrated species.

Propose to land southeast of hummocks

Why is this a good landing site:

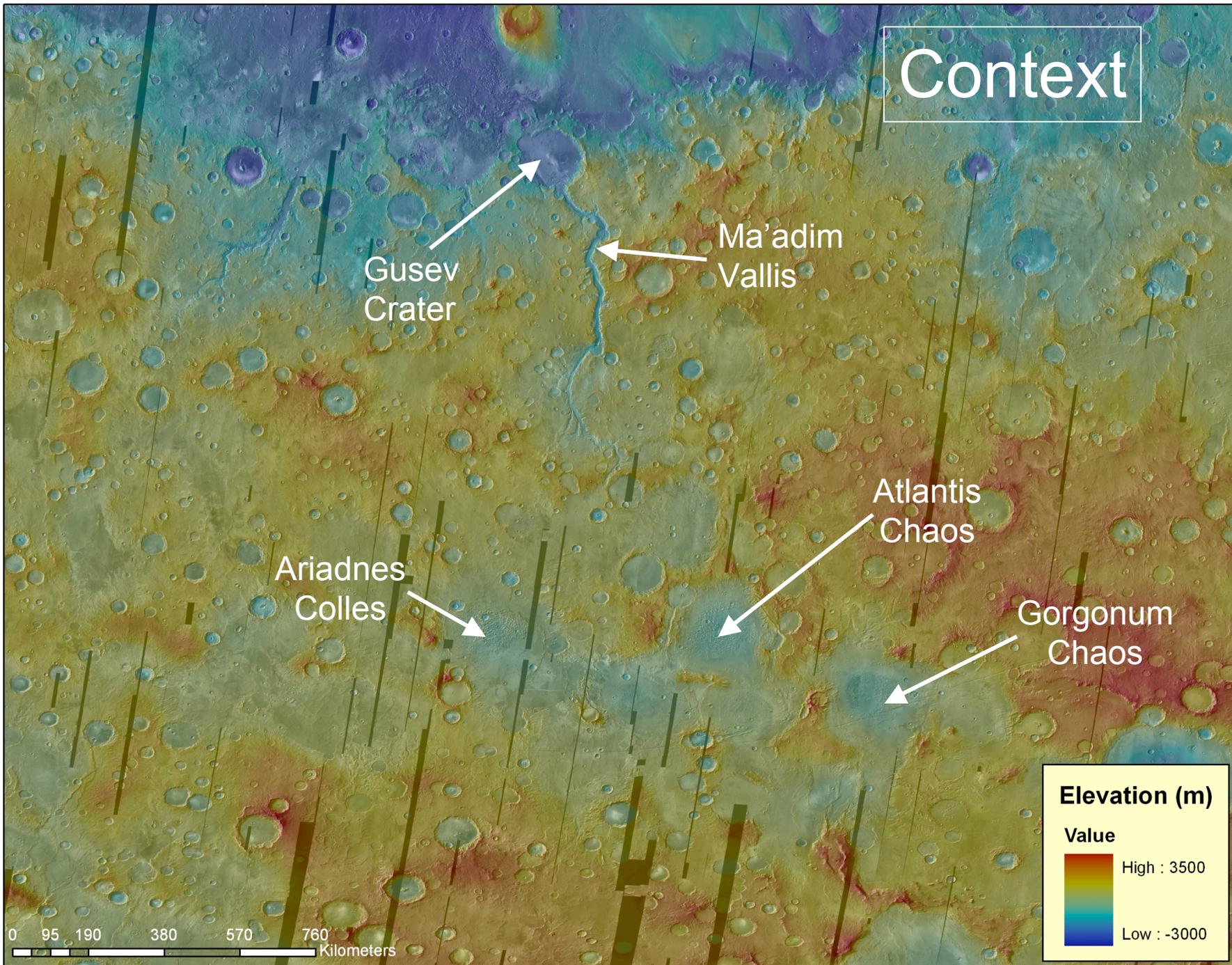
Engineering:

- Very little relief in landing ellipse
- Terrain smoother than Gusev at MOC resolution
- Lots of flexibility on landing ellipse placement
- easily transitable terrain
- probably no problems with winds during EDL

Scientific

- Strong morphologic evidence for past lacustrine system
- presence of hydrous minerals (phyllosilicates) in hummocks
- Excellent location to address habitability issue
- *Location would allow us to study modern mid-latitude processes

Context



Gusev
Crater

Ma'adim
Vallis

Ariadnes
Colles

Atlantis
Chaos

Gorgonum
Chaos

0 95 190 380 570 760
Kilometers

Elevation (m)

Value

High	: 3500
Low	: -3000

Why is Eridania Basin thought to have held water?

Valley networks:

present on most $>0.5^\circ$ slopes > 700 m elevation in Eridania.
do not extend below 700 m elevation despite the occurrence of regional slopes of 0.5 - 1.5° below 700 m elevation.

most terminate over a range of elevation, with most ending at the plains boundary between 1100 and 950 m (which is the elevation of the Ma'adim Vallis head).

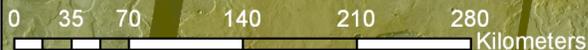
Undissected relief within Eridania basin floor amounts to 500 – 1200 m depending on the subbasin.

Large relief of degraded craters:

typical degraded craters on Mars have flat floors.

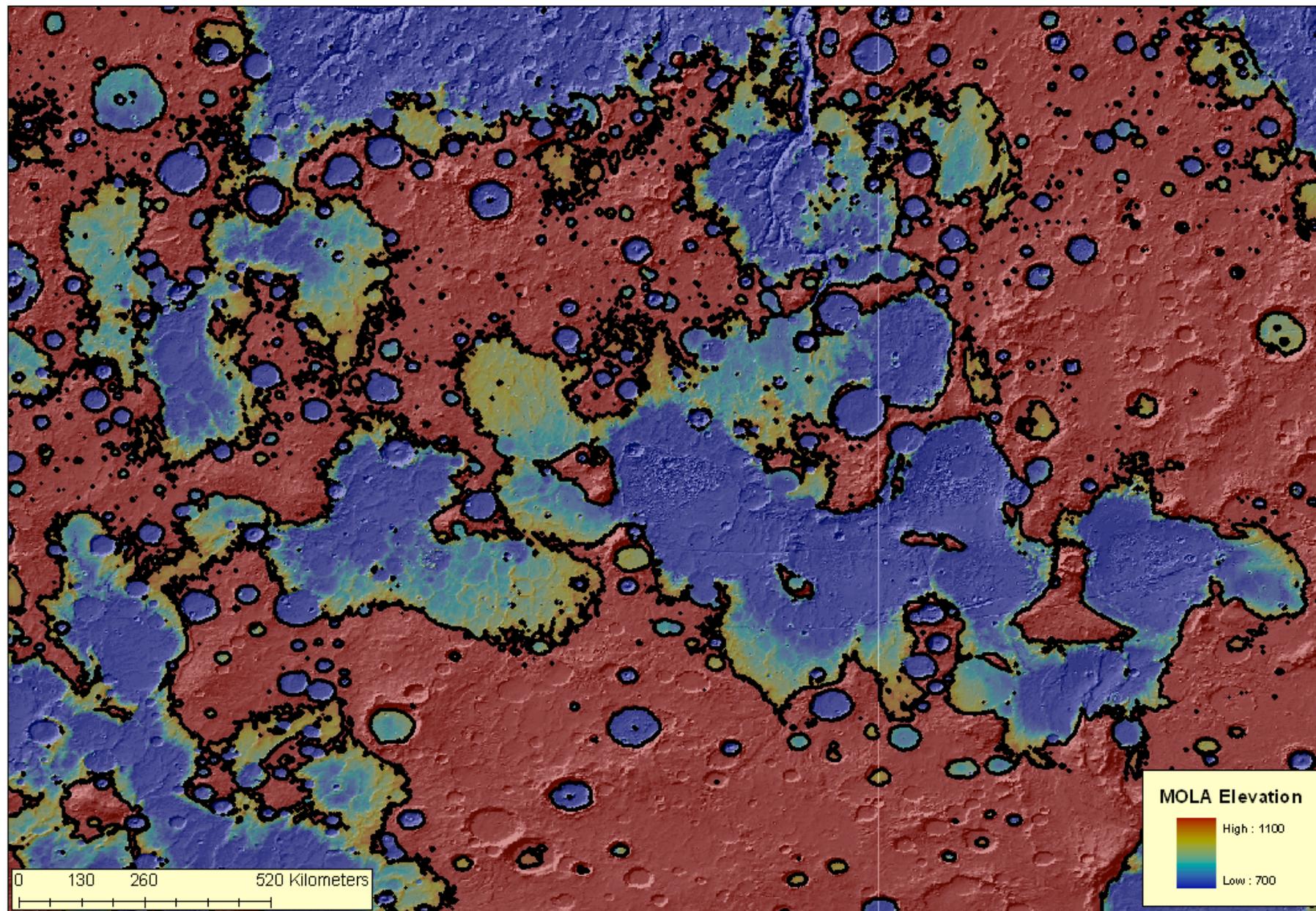
degraded craters forming Eridania Basin have concave-up profiles below 700 m, indicating that sediment transport was inefficient toward the center of the craters below that elevation – consistent with the presence of standing water.

Break in slope: below 1100-1200 m, transitioning to the Eridania basin floor plains that lie approximately between 700 and 1100 m

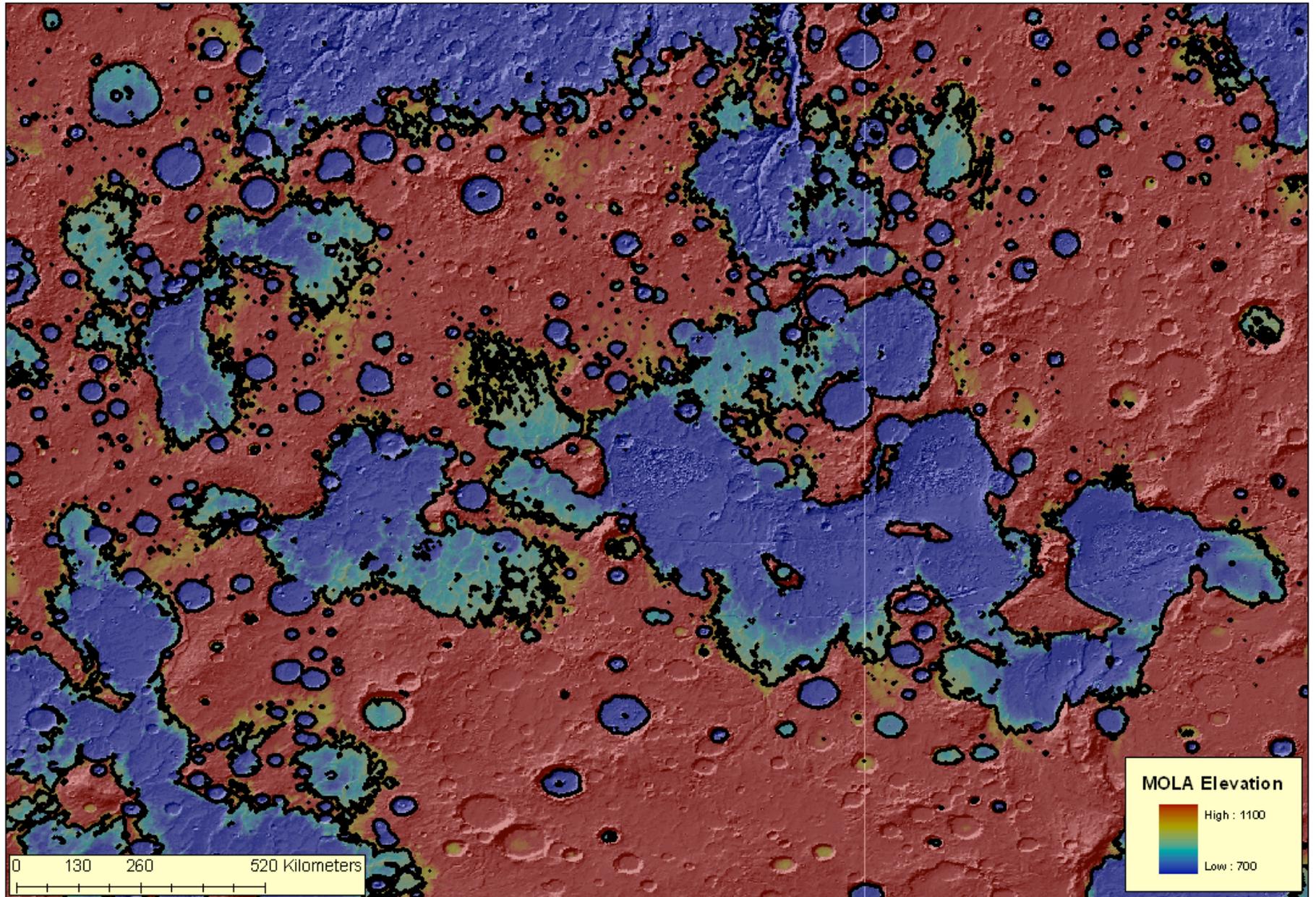


Low : -3000

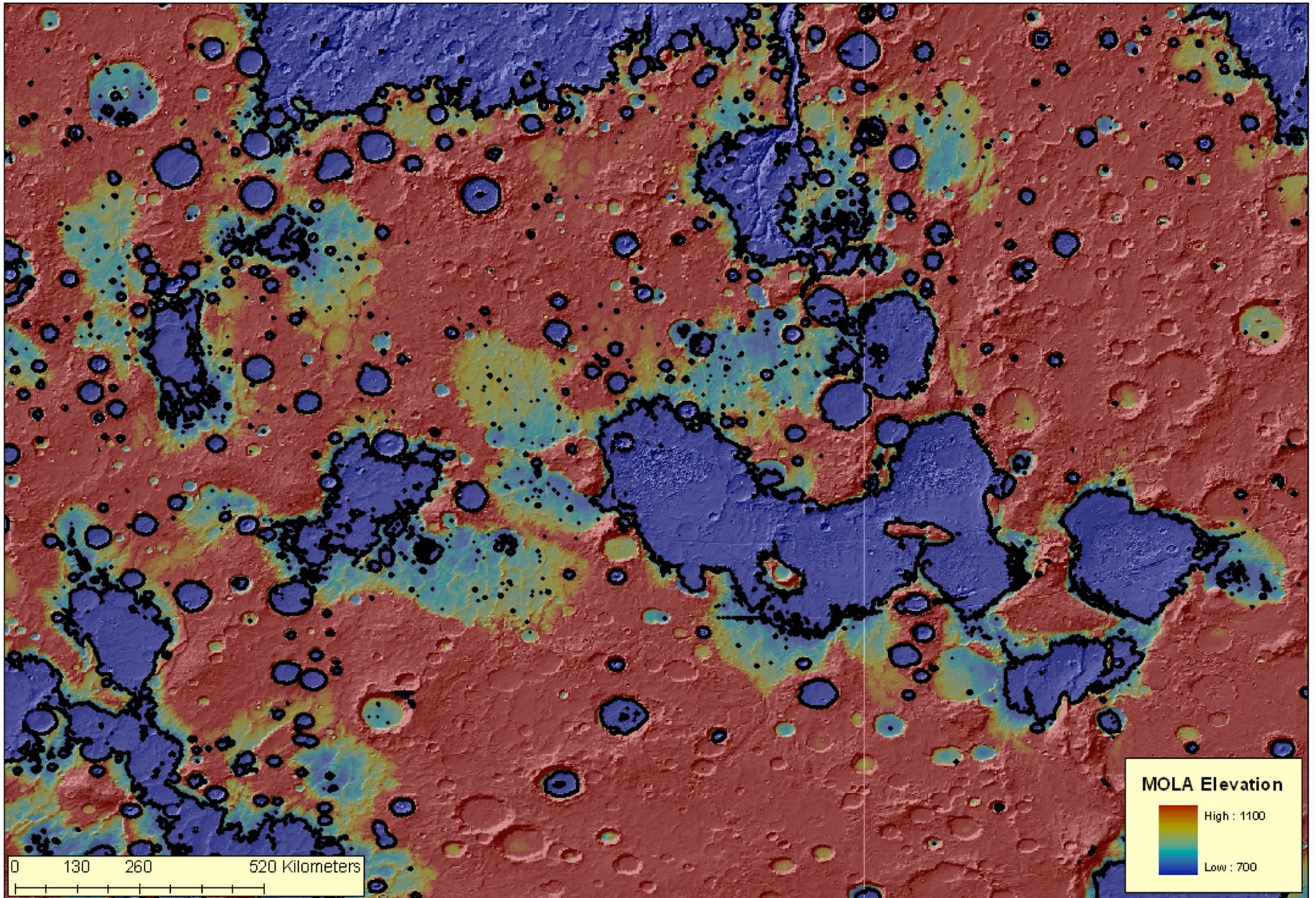
1100 m Contour



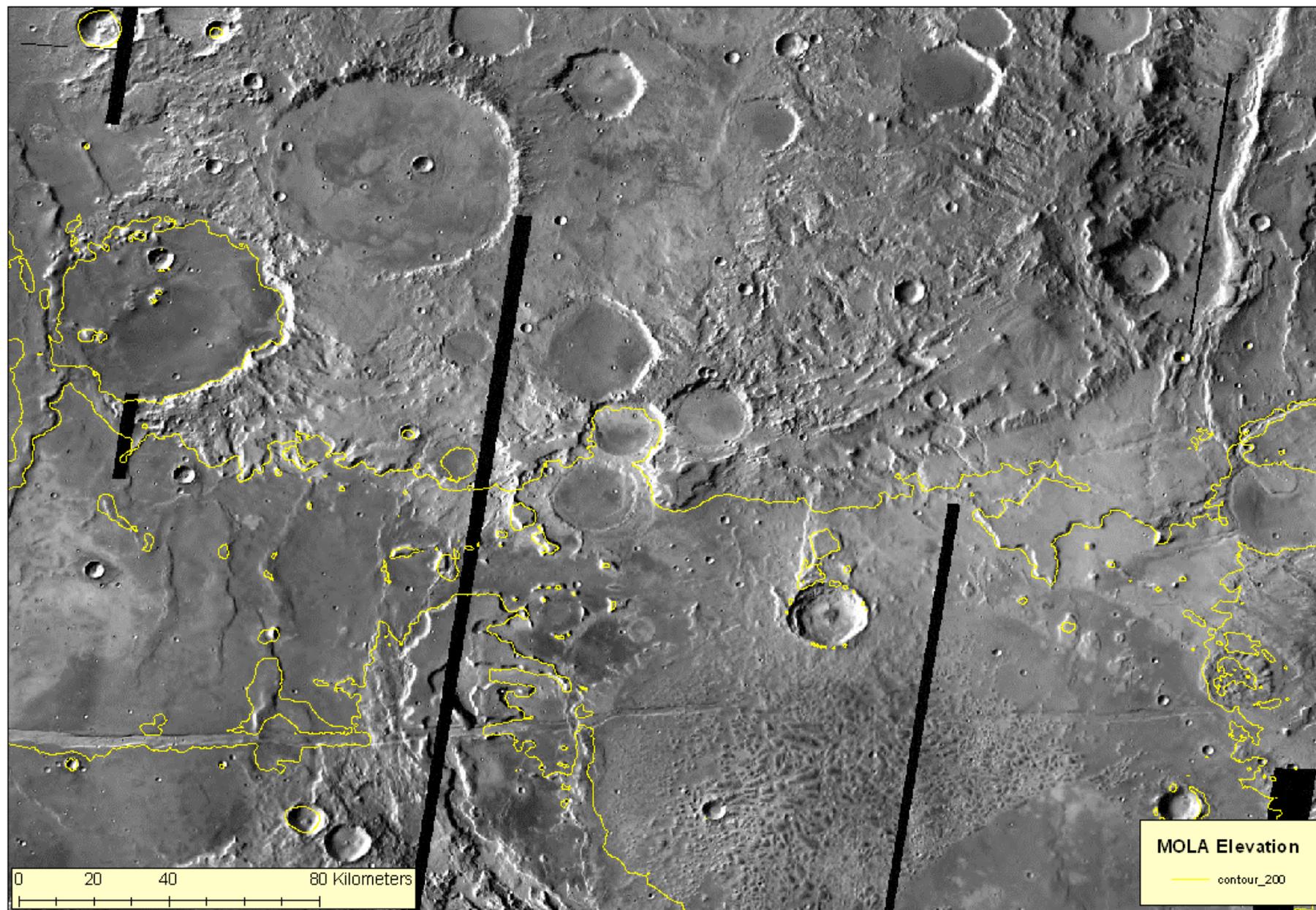
950 m Contour



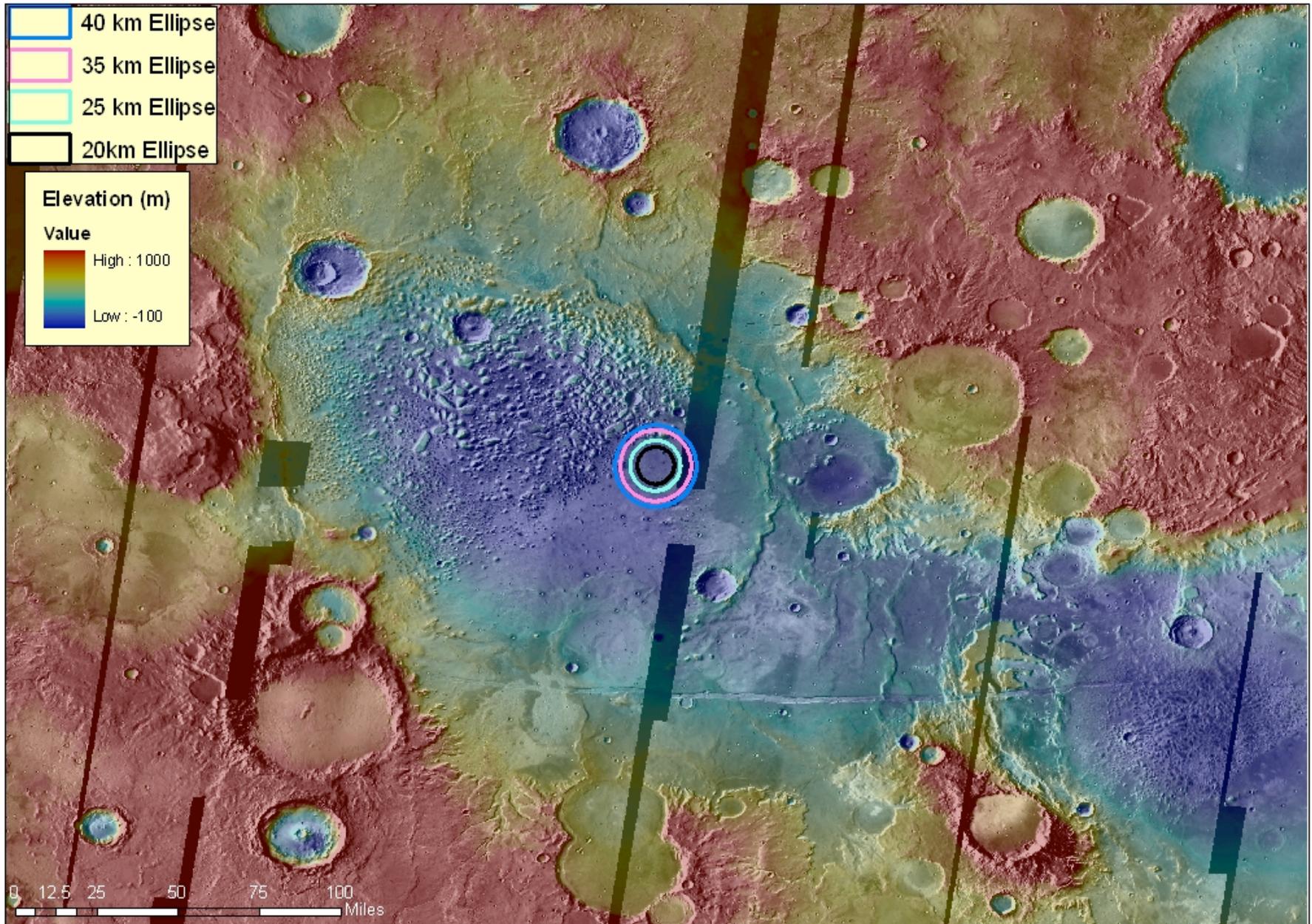
700 m Contour

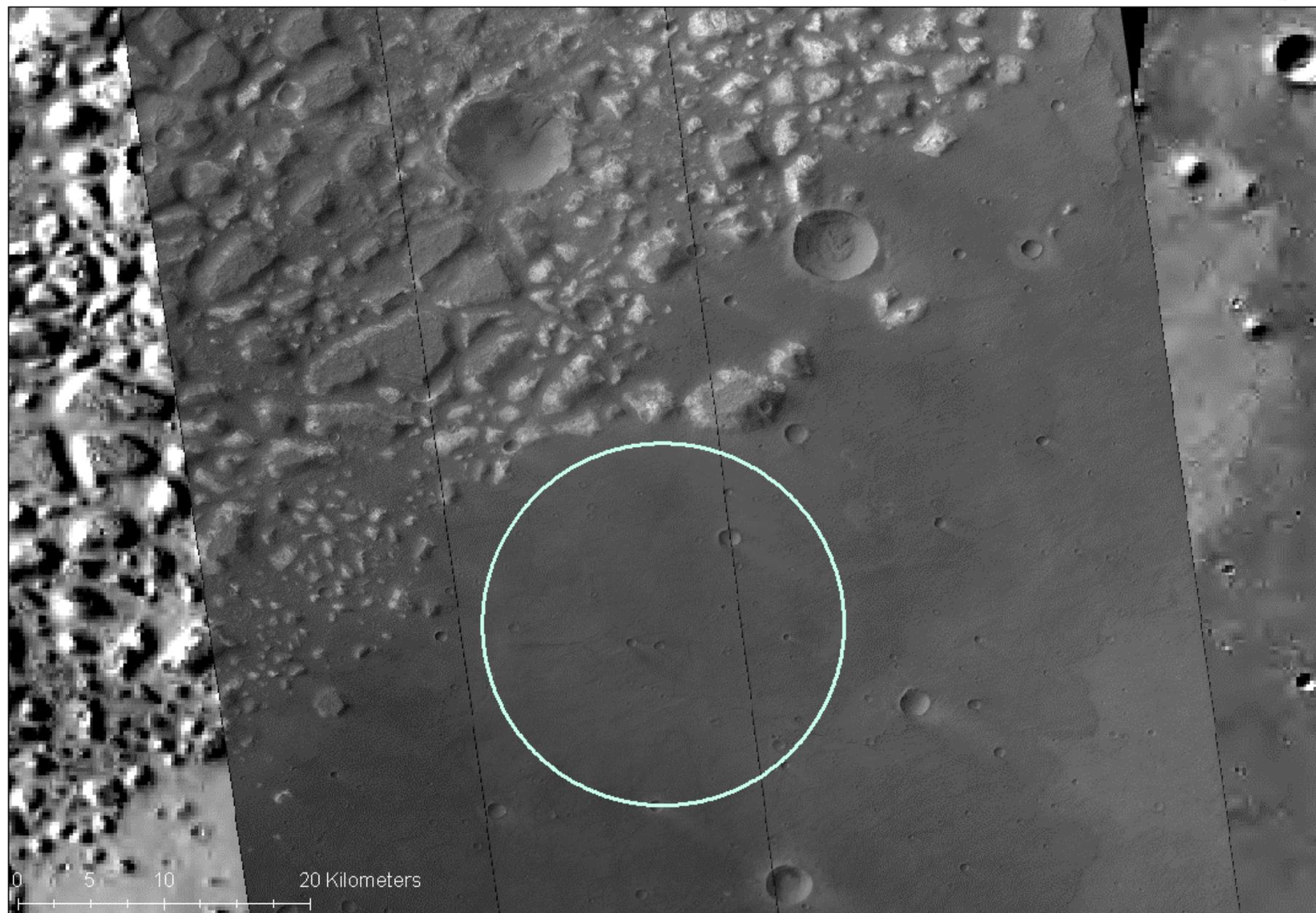


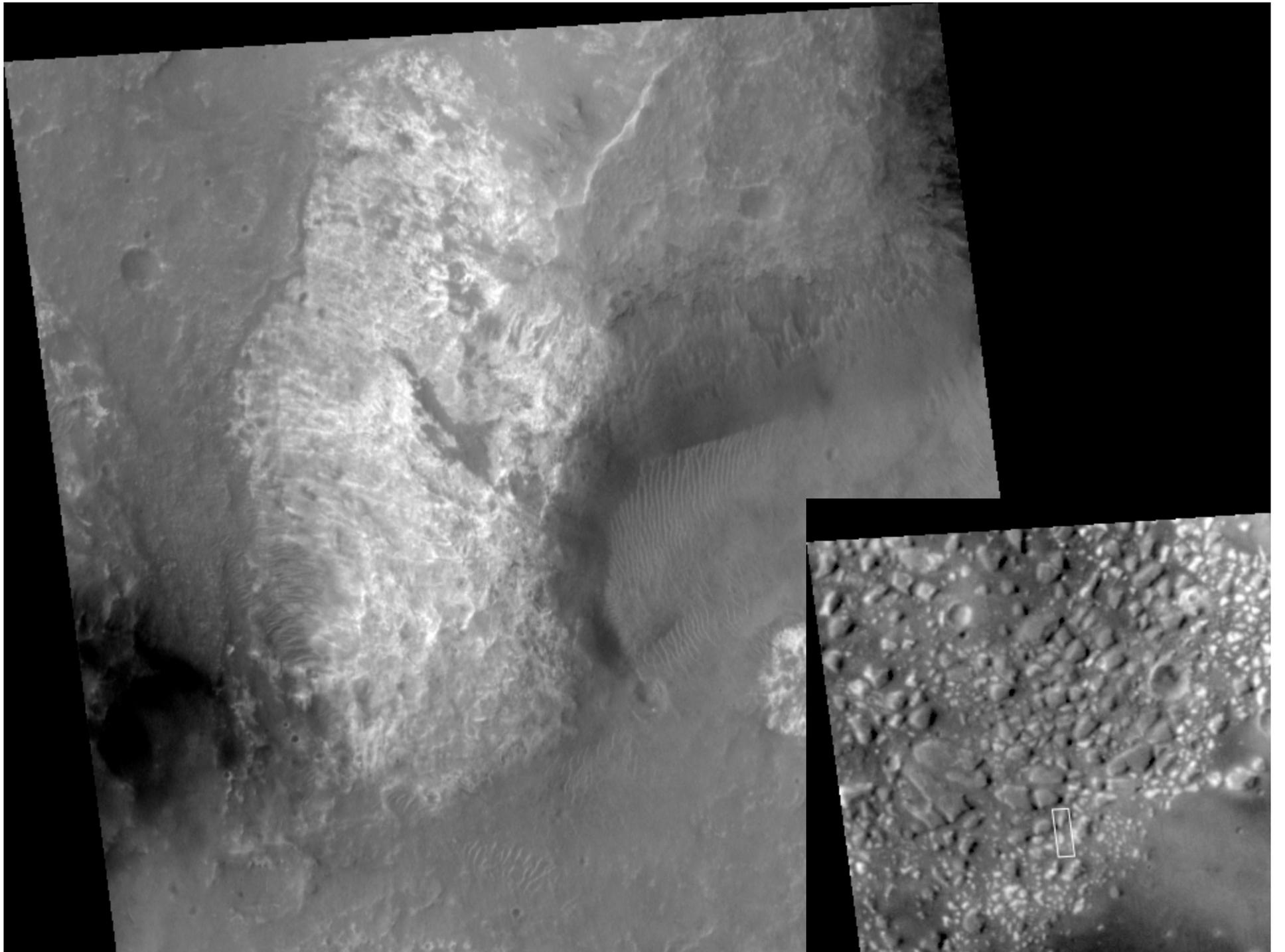
Escarpments at 200 m

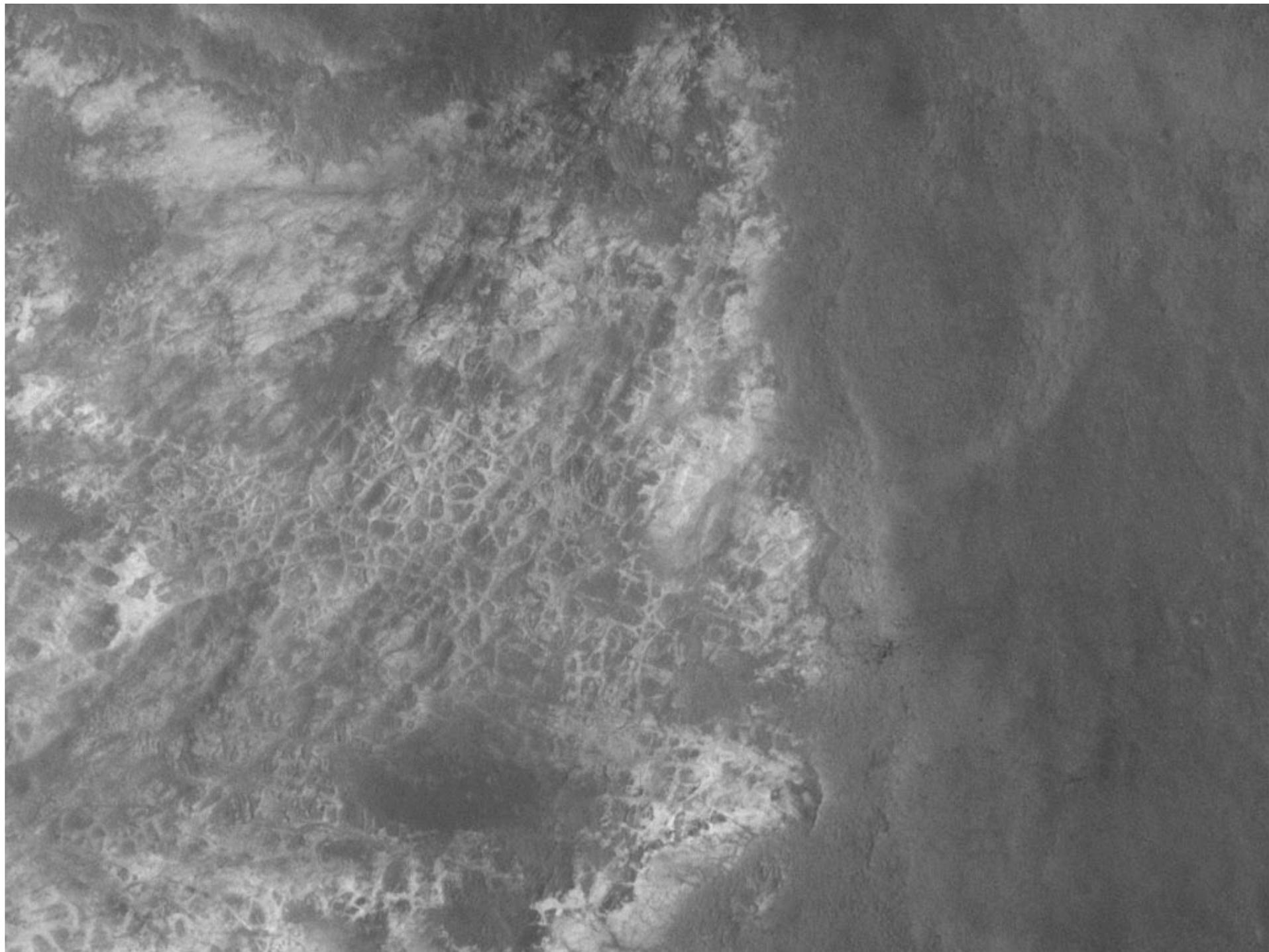


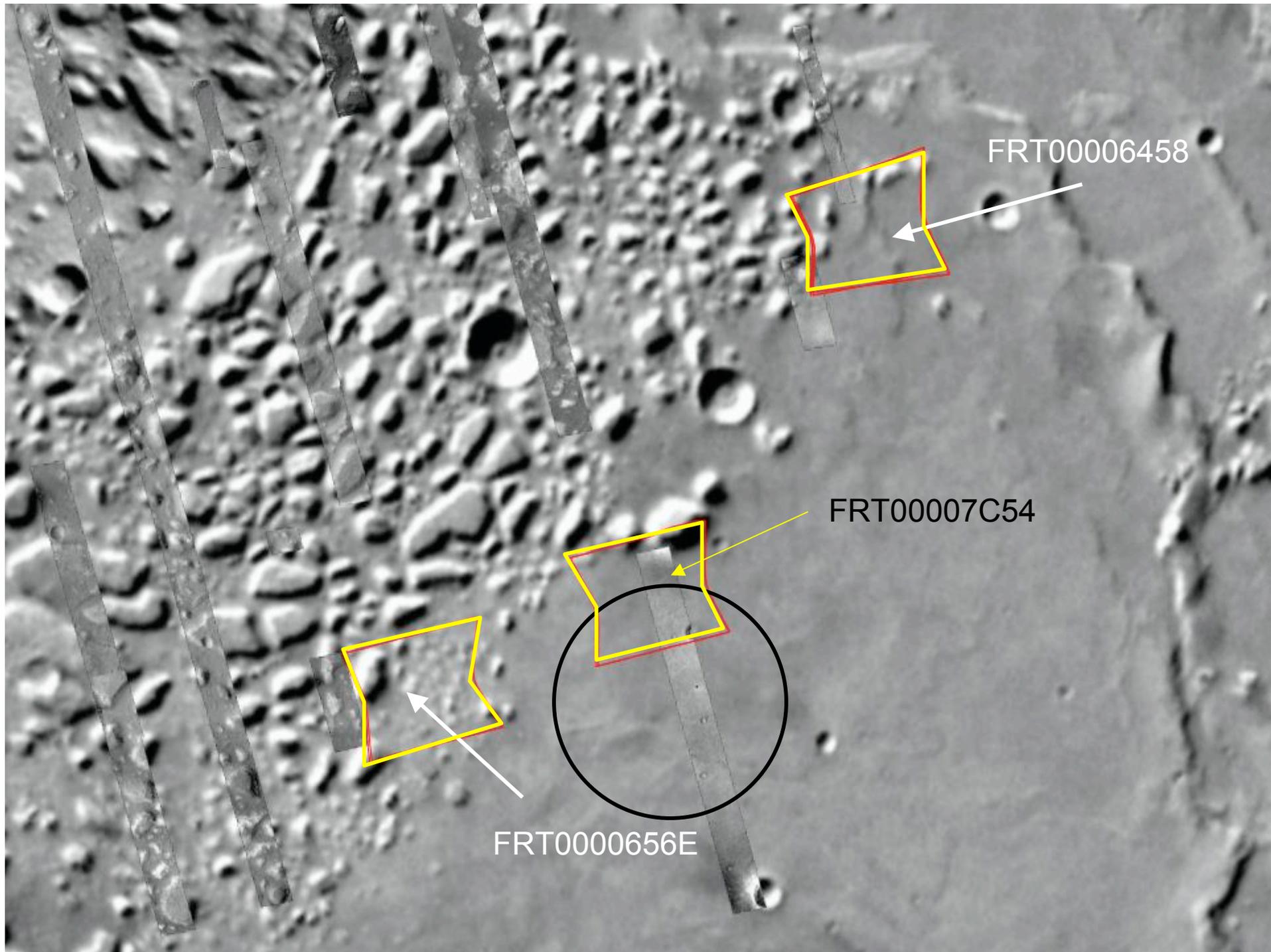
Ariadnes Colles
35.03 S, 174.17 E
Center Elevation -71 m









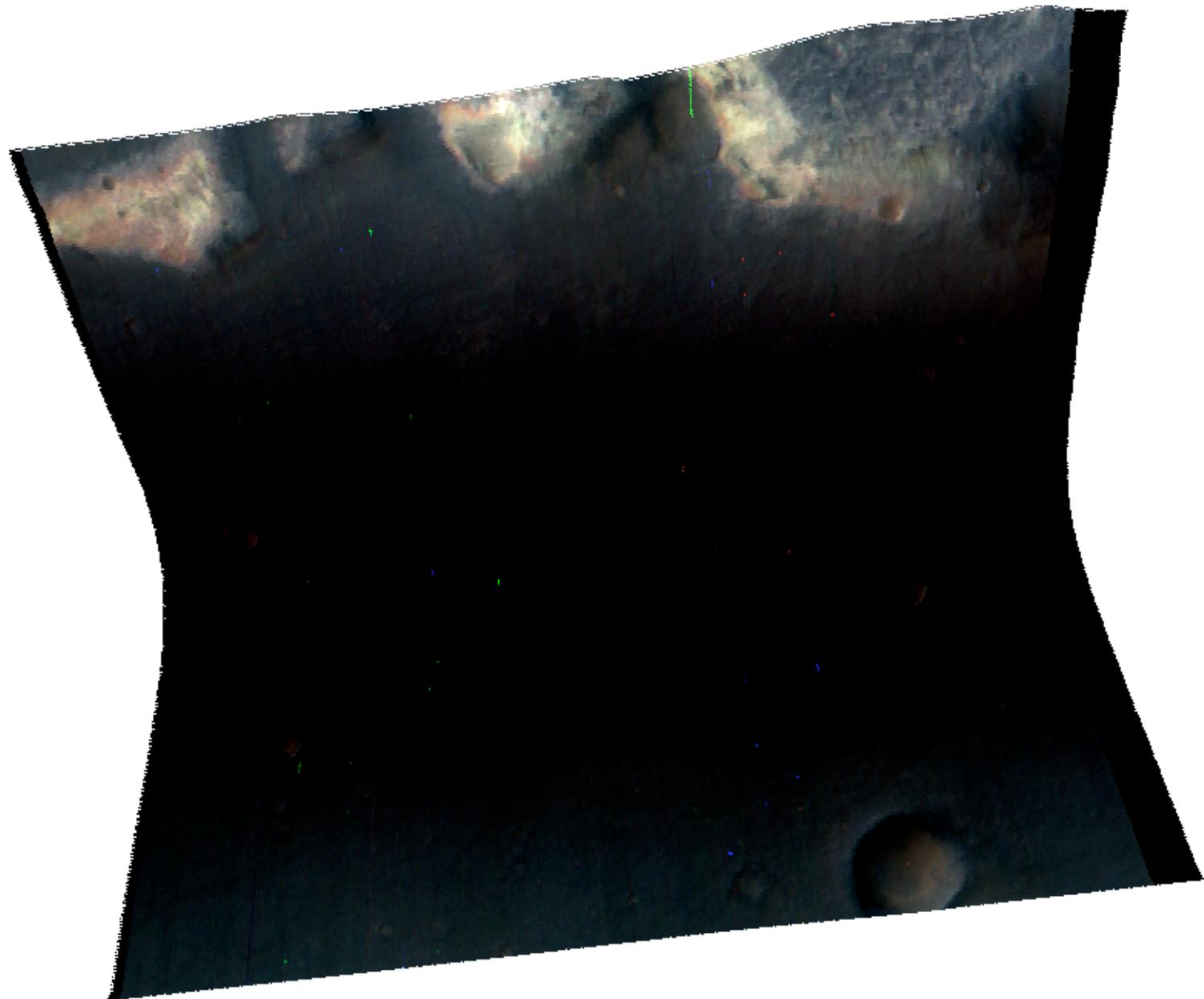


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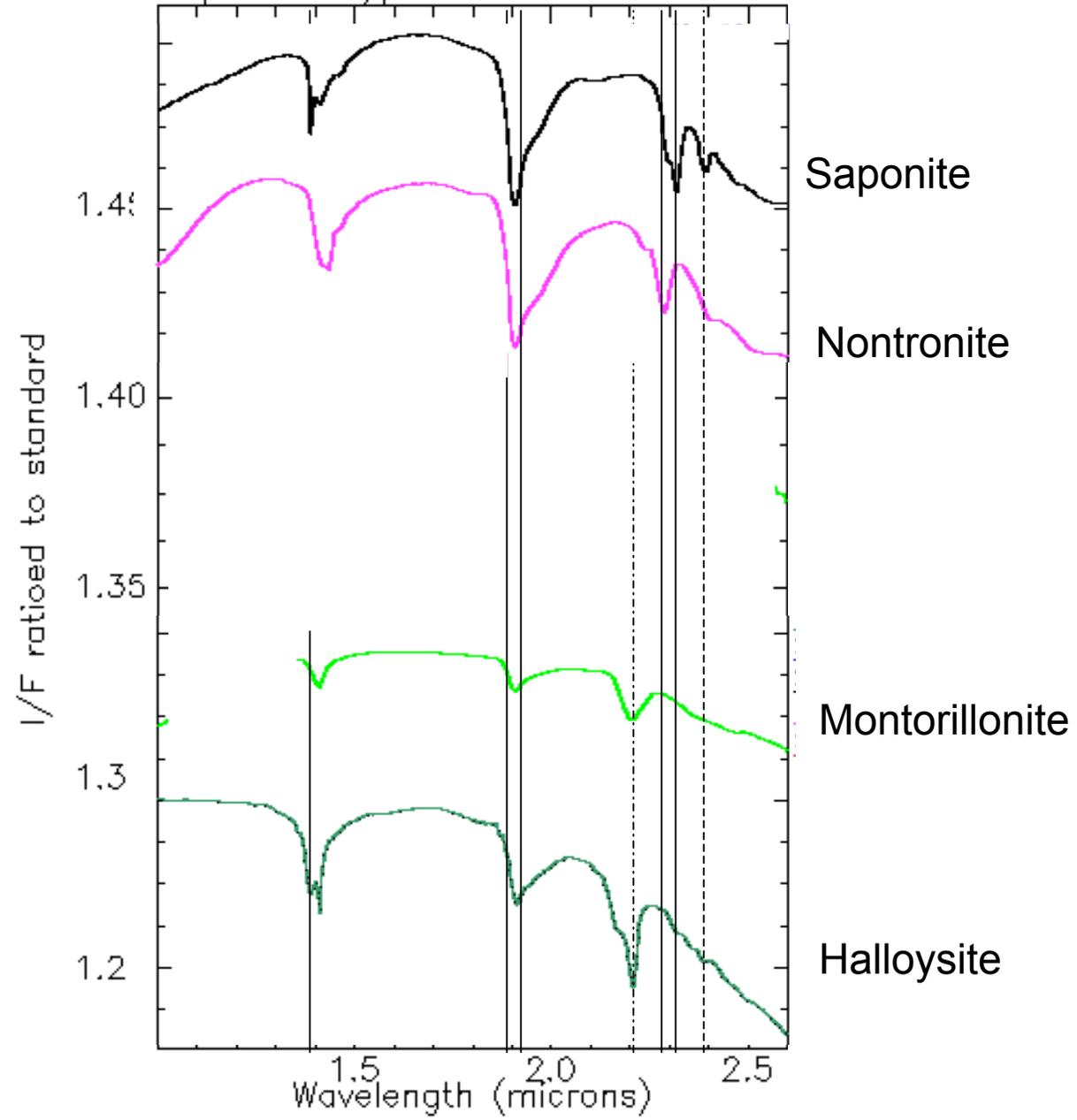
FRT00007C54

FRT0000656E

FRT00007C54



Spectral types in FRT00007C54

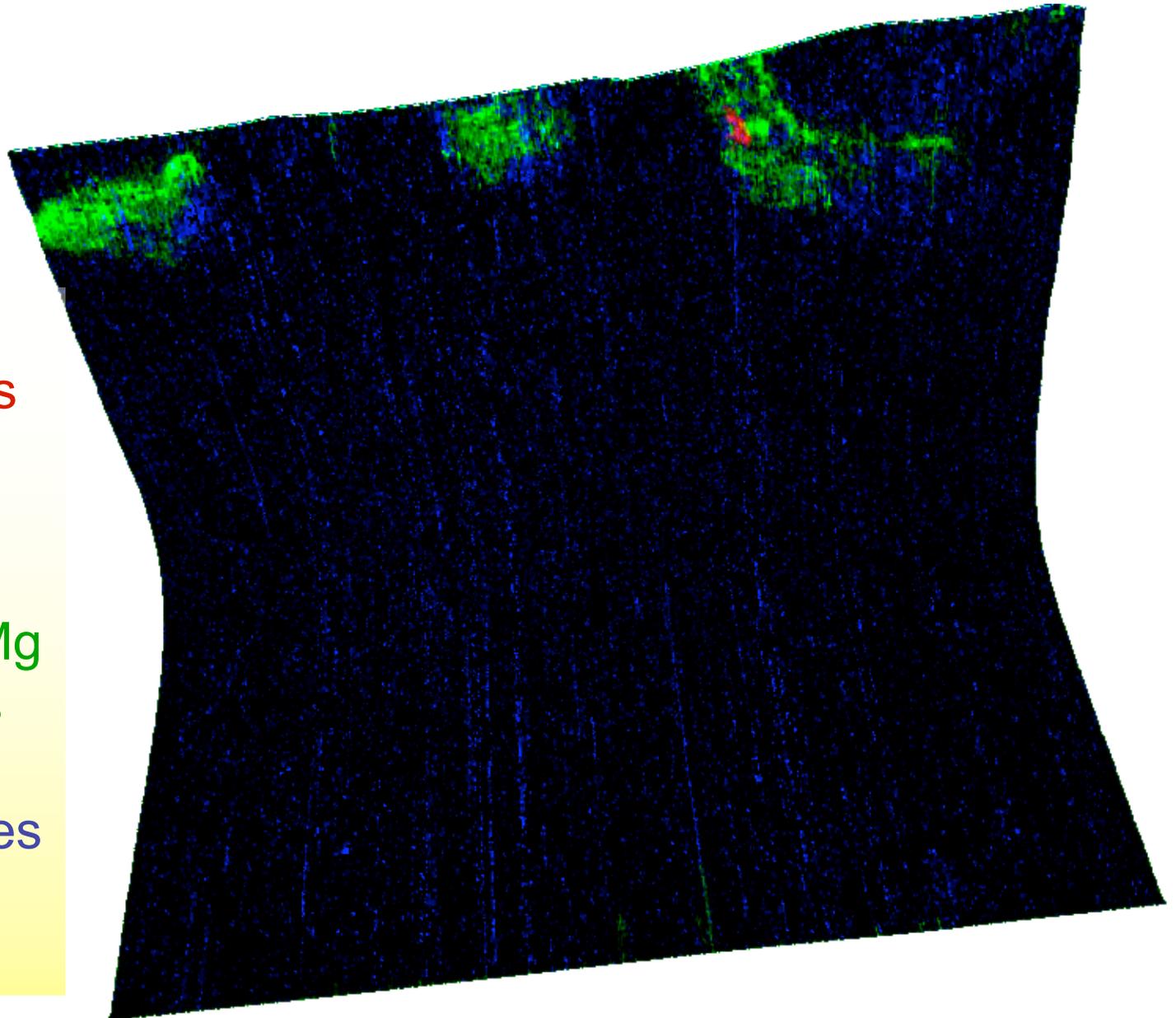


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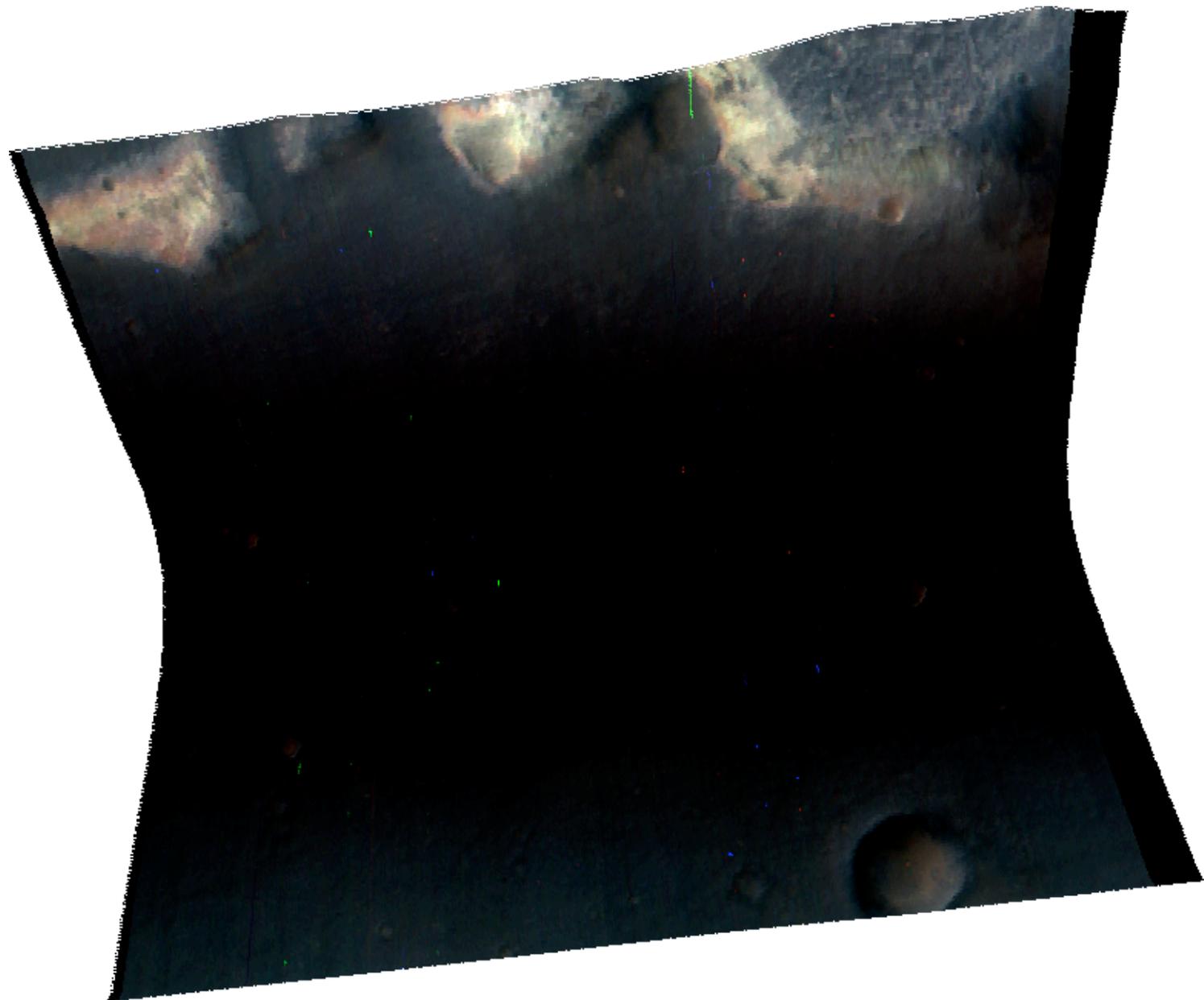
Red = Al-
Phyllosilicates
or hydrated
silica

Green = Fe/Mg
Phyllosilicaes

Blue = Sulfates
or hydrated
silica



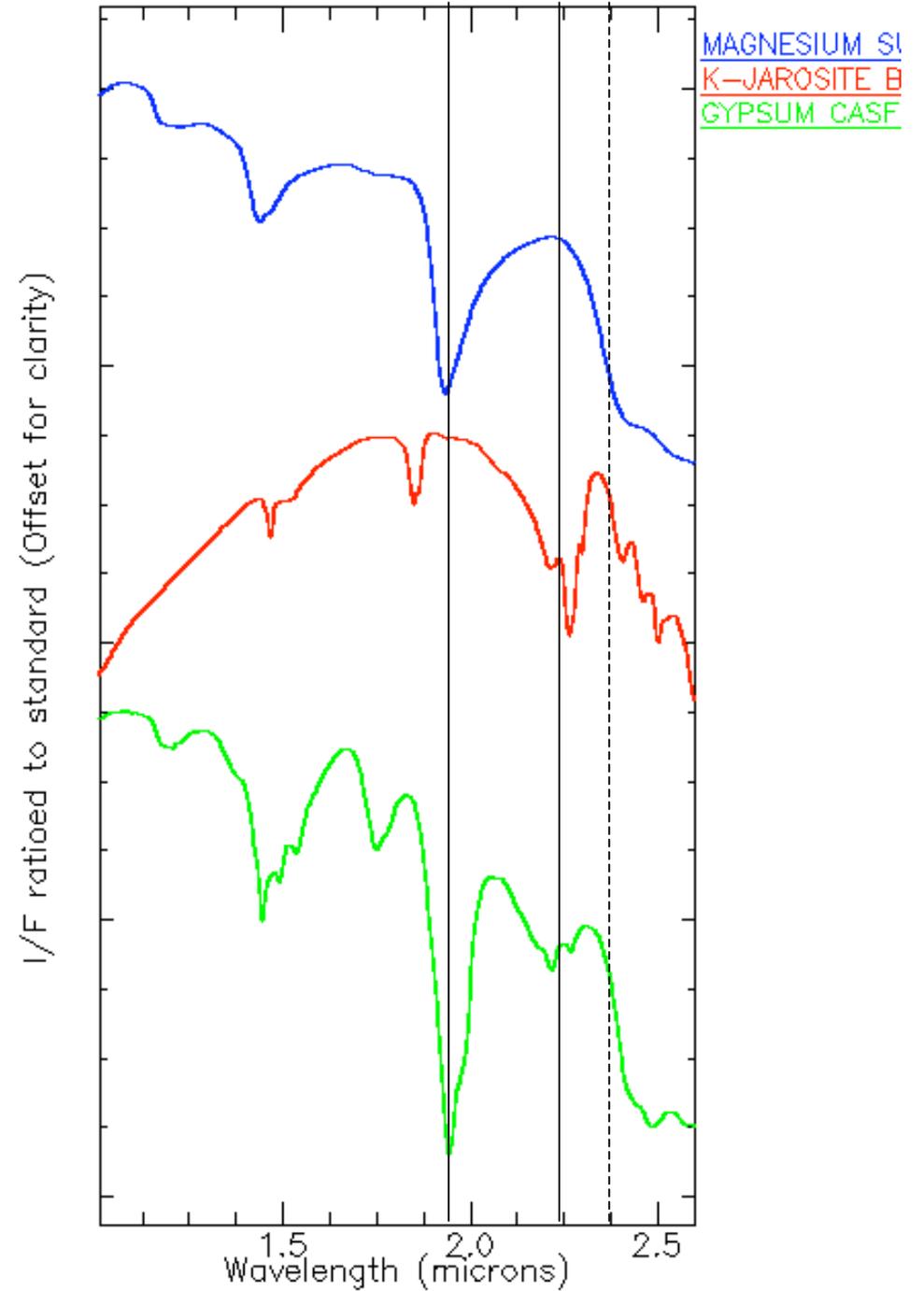
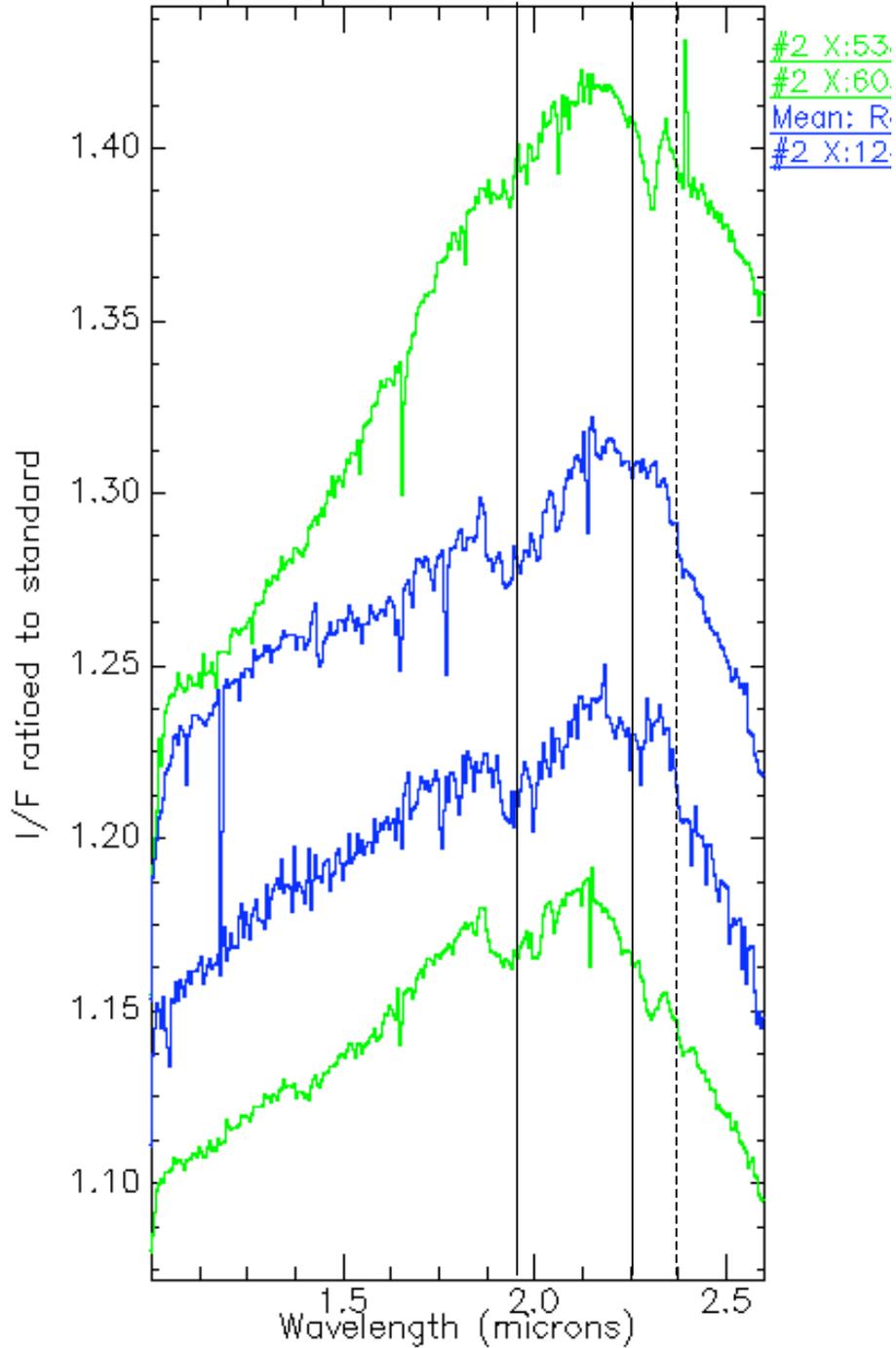
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FRT0000656E



Sample Spectra for FRT0000656E

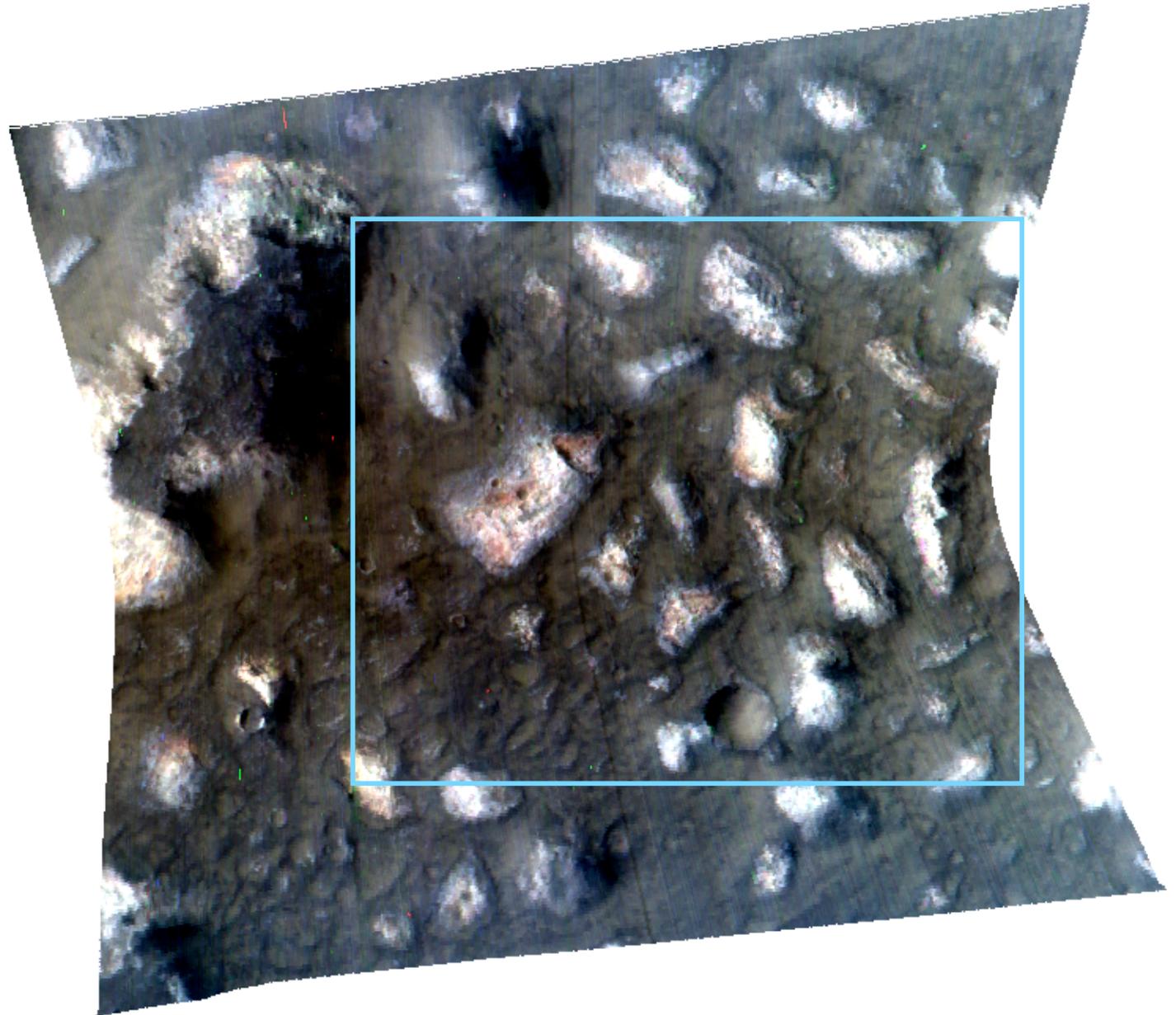


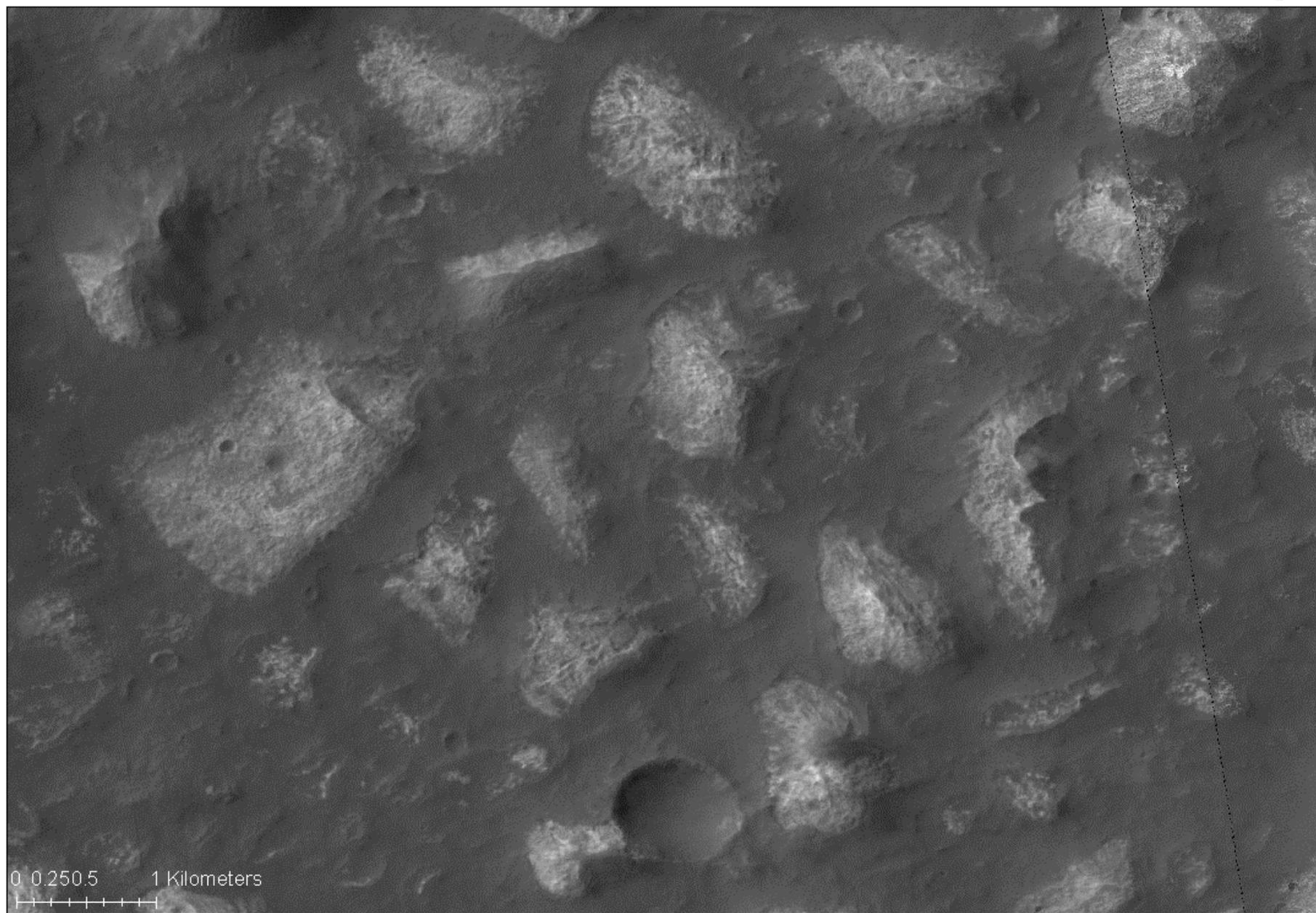
FRT0000656E

- Red = Ferrous index
- Green = Fe/Mg phyllosilicate index
- Blue = SINDEX

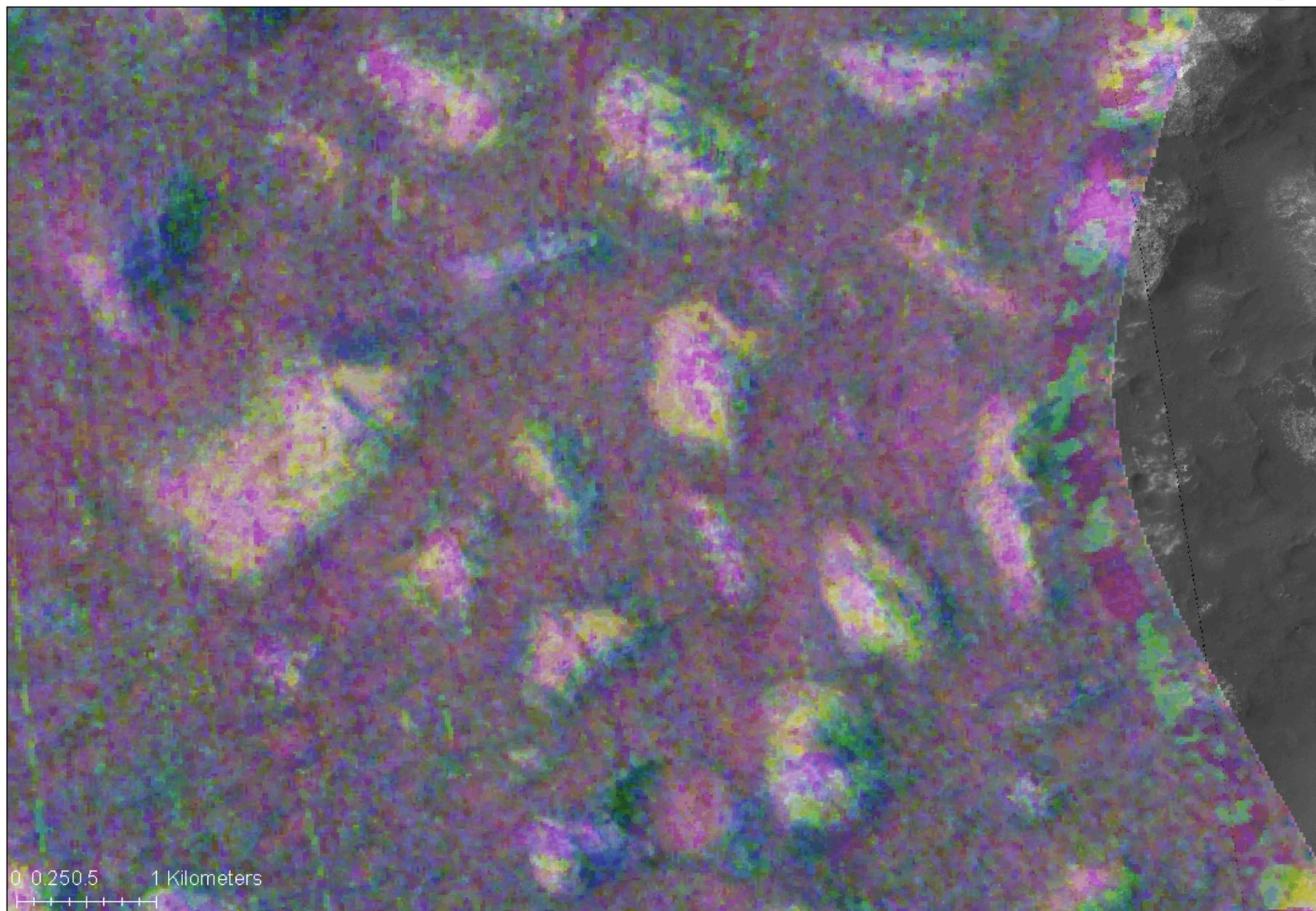


FRT0000656E





0 0.250.5 1 Kilometers
|-----|-----|-----|-----|-----|

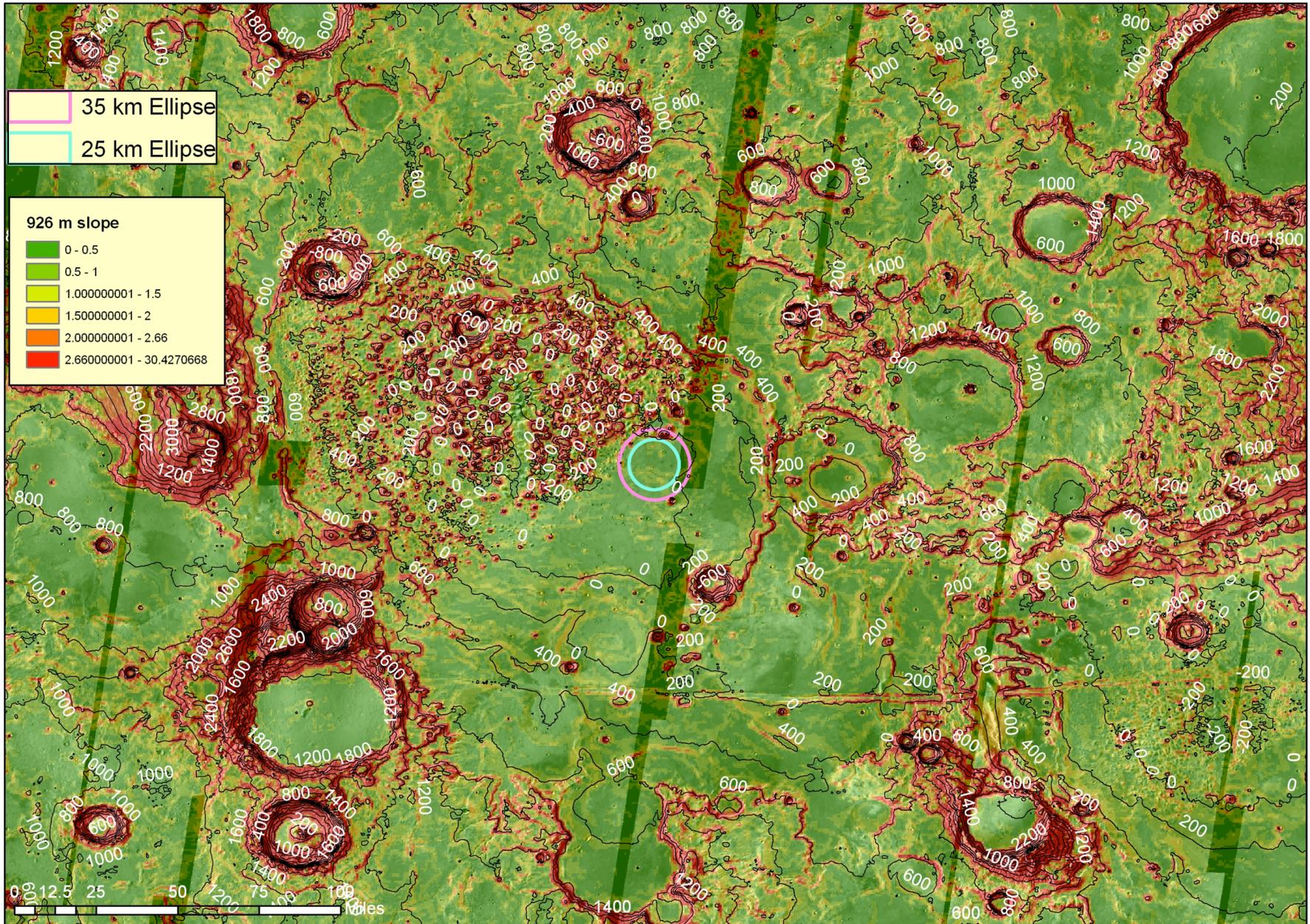


0 0.25 0.5 1 Kilometers

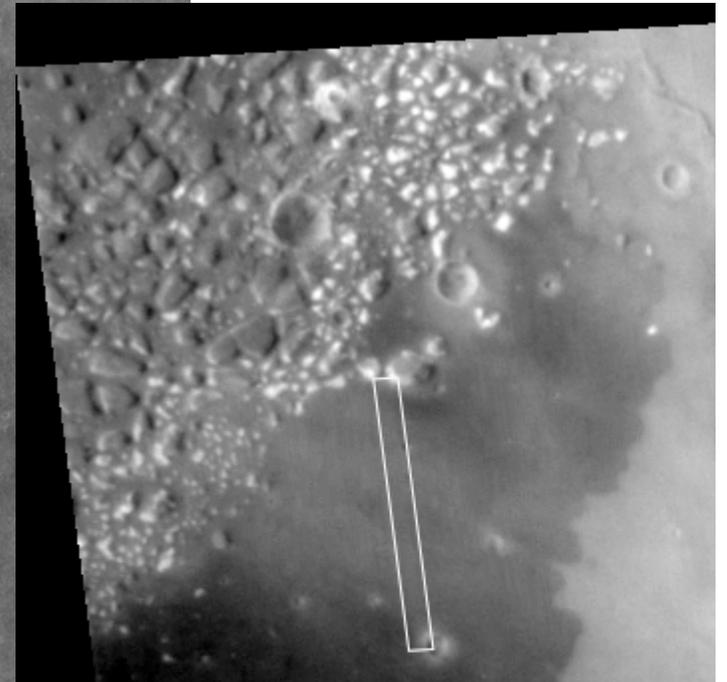
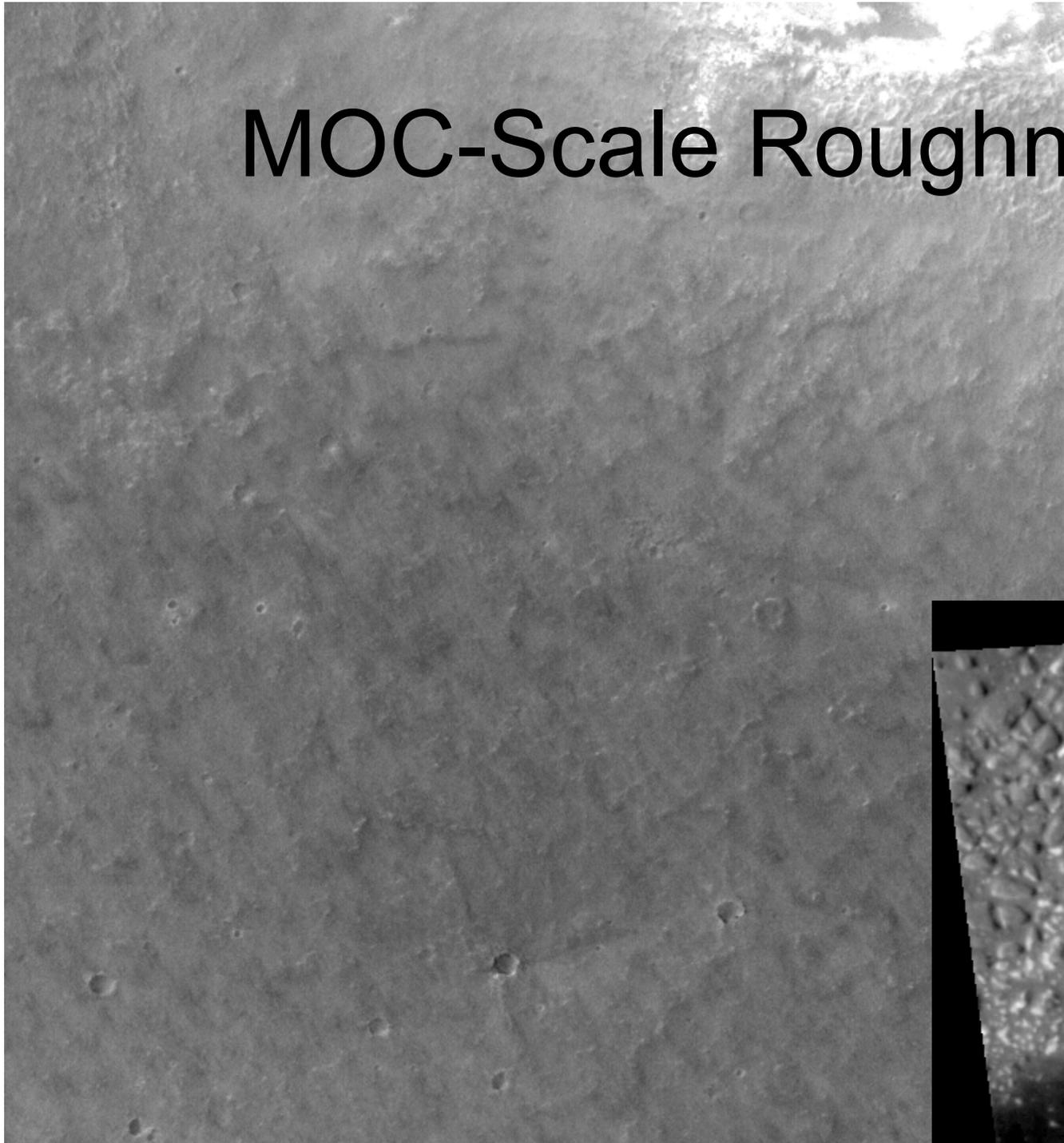
Engineering constraints

- Latitude = **35 S** (desire 35 N – 45 S)
- Elevation = **-71 m** (desire < 1000 m)
- Slopes: **< 2 deg over 900+ m intervals**
- Winds: Terrain around Ariadnes Colles is smooth → **streamlined winds** from most directions*.
- Flexibility of Ellipse Placement: **Excellent**
- Boulders: **few**
- Trafficability: **very good**

Ariadnes Colles
35.03 S, 174.17 E
Center Elevation -71 m

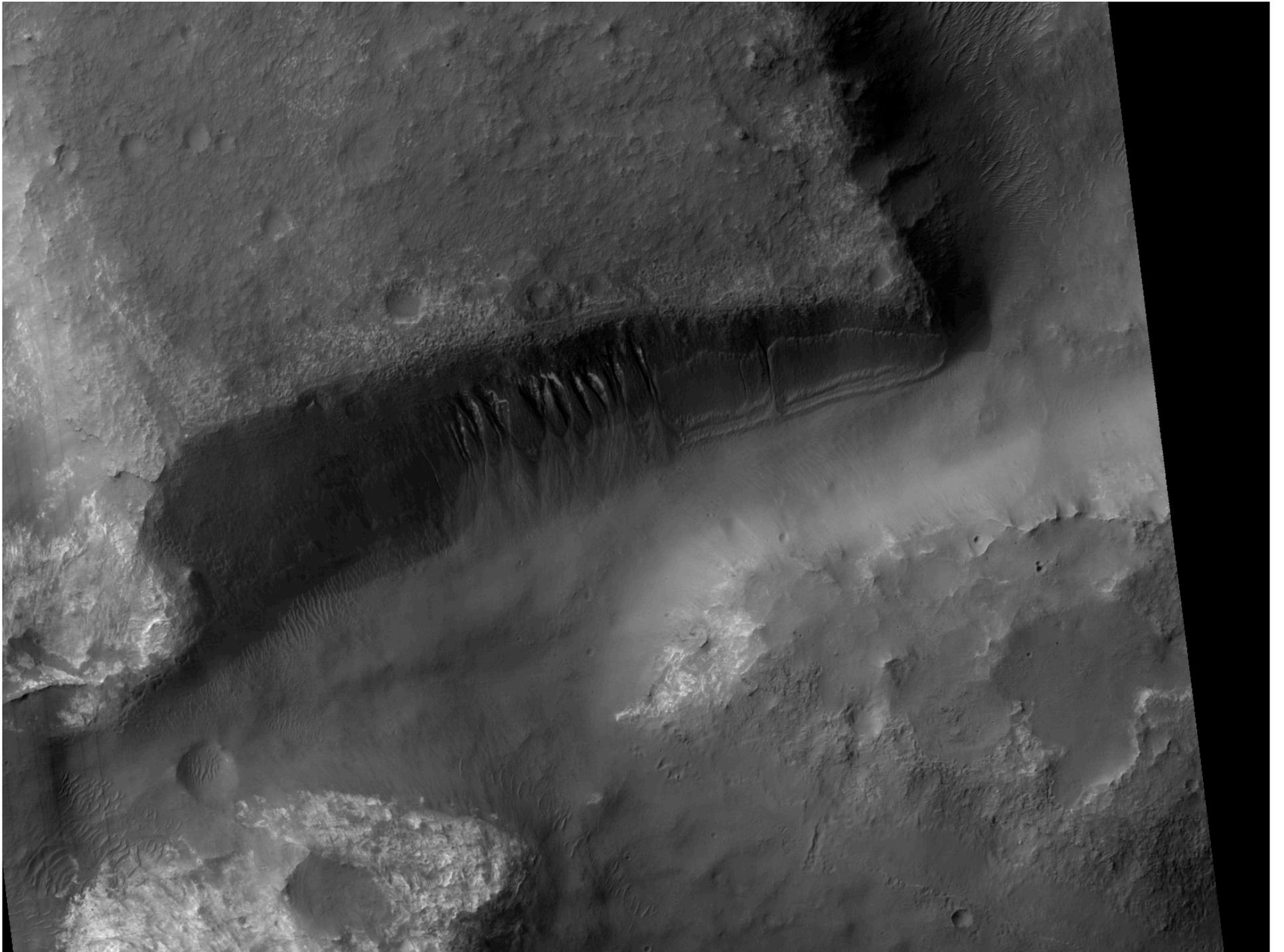


MOC-Scale Roughness



HiRISE-scale Roughness





Ariadnes Colles

- Part of a larger, possibly paleo-lacustrine system
- Hummocks consist of light-toned indurated material
- CRISM spectra consistent with the presence of
 - Fe/Mg smectites,
 - possibly Al-smectites,
 - other hydrates (possibly sulfates).
- Why is this a good landing site:
 - Engineering:
 - Very little relief in landing ellipse
 - Terrain smoother than Gusev at MOC and HiRISE resolution
 - Lots of flexibility on landing ellipse placement **at MOLA and MOC resolutions, respectively**
 - easily transitable terrain
 - **Ellipse in wide open, smooth landscape** – probably no problems with winds during EDL.
 - Scientific
 - Strong morphologic evidence for past lacustrine system
 - presence of a diversity of hydrated minerals in terrain
 - Excellent location to address habitability issue
 - Excellent location to study modern mid-latitude processes